the quantity of inflammable gas amounts to one twelfth part of the atmospheric air present, an explosion may take place.

For the purpose of preventing such accidents, Dr. Clanny has contrived to insulate a candle, by water placed both above and below the lantern in which it is contained. The air, which is intended to support the flame, is supplied by means of a pair of common bellows, by which it is forced through the water beneath the flame; and it is again emitted, after having supported the combustion, by a bent tube that passes into water from the top of the lantern.

In consequence of this arrangement, if the air of the mine becomes liable to inflame, the explosion will be confined to the mere content of the lantern, of which only a small part will be consumed, unless the quantity of inflammable gas be very suddenly increased.

This communication is accompanied by drawings of the lantern and its parts in detail, whereby any workman may be enabled to execute it according to the design of the author.

On the Light of the Cassegrainian Telescope, compared with that of the Gregorian. By Captain Henry Kater, *Brigade-Major. Communicated by the Right Hon. Sir* Joseph Banks, *Bart. K.B. P.R.S.* Read May 27, 1813. [*Phil. Trans.* 1813, *p.* 206.]

The author having remarked the performance of a Cassegrainian telescope, made by a self-taught artist at Ipswich, to be superior to what he believes is usually expected from telescopes of this construction, has been led to make a series of experiments on the comparative illumination given by the Cassegrainian compared with that obtained by the Gregorian construction. For though the Cassegrainian form has been considered merely as the Gregorian disguised, and has been rarely adopted, in consequence of its inverting objects, a superior power of illumination, if correctly ascertained to exist, may prove a valuable property, in addition to its advantage of being considerably shorter than the Gregorian.

In the telescope first compared by Major Kater, the specula were cast at the same time, in the same metal, and to the same pattern. The magnifying powers of the two instruments were ascertained by experiment to be very nearly equal, but with a small excess on the side of the Cassegrainian. The two telescopes were placed side by side, and pointed to the same object, which was a printed card, at the distance of fifty yards; and as the brightness, as seen in the Cassegrainian, was far superior, its aperture was first reduced by a ring of pasteboard, and then gradually enlarged till the card appeared equally bright through both telescopes. After the respective areas of aperture in each telescope had been measured, with due allowance for the light obstructed in each by the small mirror, that of the Cassegrainian was found to be to the Gregorian as 46 to 108, or 3 to 7 nearly.

In the second comparison made by Mr. Kater, the Cassegrainian

telescope had been made some time before the Gregorian, and its speculum had in consequence lost somewhat of its original polish. But notwithstanding this source of disadvantage on the side of the Cassegrainian, a corresponding superiority again appeared in its power of illumination.

The areas of aperture were in this instance as 79 to 110; but as the magnifying powers were not equal but in the ratio of 108 to 182, it was necessary to make further allowance, in proportion to the squares of these numbers; so that the illuminating powers were found to be nearly as 3 to 2.

From the mean of these experiments, and from consideration of all circumstances, the author conceives that the relative superiority of the Cassegrainian may be stated to be as 60 to 33, or 20 to 11.

With respect to the probable cause of the difference thus observed, Major Kater conjectures that it may possibly depend on the mutual interference of rays meeting in the same point, which it is possible may be in great measure dissipated when received by the small speculum in the Gregorian, after crossing in the principal focus; while on the contrary, in the Cassegrainian, the loss of light from this source is avoided, since the small speculum in that construction receives the rays before they arrive at the focus, and before they become sufficiently concentrated to interfere with each other's motion.

This conjecture, it is observed, derives additional support from a circumstance that has been observed with respect to refracting telescopes; namely, that in a comparison between the simple astronomical telescope and a Galilean of equal aperture and power, the satellites and belts of Jupiter may be seen much more distinctly in the latter, where the rays are received by a concave lens before their intersection in the principal focus of the object-glass.

Additional Observations on the Effects of Magnesia in preventing an increased Formation of Uric Acid; with Remarks on the Influence of Acids upon the Composition of the Urine. *By* William Thomas Brande, *Esq. F.R.S. Prof. Chem. R. I. Communicated by the Society for improving Animal Chemistry.* Read June 3, 1813. [*Phil. Trans.* 1813, *p.* 213.]

This communication consists of two parts: the first of which is a confirmation of the beneficial effects of magnesia in preventing the deposit of uric acid from the urine of persons subject to the formation of a redundancy of that ingredient; and the second part relates to the trial of acid remedies in disorders of an opposite nature, where the urine is found to deposit either the ammoniacal phosphate of magnesia or phosphate of lime.

The first section contains two cases; the first of a gentleman who was accidentally induced to employ magnesia for the purpose of relieving indigestion, occasioned by the use of alkaline remedies, and who thereby fortunately corrected a tendency to form red sand, for which those medicines had been taken ineffectually.